CLAIMS

What is claimed is:

1. An integrated circuit package apparatus comprising:

an integrated circuit having at least one node for receiving a sensed tip signal and at least one node for receiving a sensed ring signal of a subscriber loop, wherein the integrated circuit generates a control signal for a subscriber loop linefeed driver in response to the sensed tip and ring signals, wherein the linefeed driver does not reside within a same integrated circuit.

2. The apparatus of claim 1 wherein the sensed tip signal is a differential signal proportional to a tip current, wherein the sensed ring signal is a differential signal proportional to a ring current.

3. The apparatus of claim 1 wherein the integrated circuit is a complementary metal oxide semiconductor (CMOS) integrated circuit.

4. A subscriber loop linefeed driver comprising:

sense circuitry providing a sensed tip signal to a first node set of an integrated circuit and a sensed ring signal to a second node set of an integrated circuit, wherein the sensed tip signal corresponds to a tip current of the subscriber loop, wherein the sensed ring signal corresponds to a ring current of the subscriber loop, wherein each of the first and second node sets includes at least one node distinct from the other set; and

power circuitry for providing battery feed to a ring node and a tip node of a subscriber loop in accordance with a control signal generated by the integrated circuit in response to the sensed tip and ring signals.

5. The subscriber loop linefeed driver of claim 4 wherein the sense circuitry comprises:

a tip resistor series-coupled to the tip node and the power circuitry;

a pair of tip sampling resistors one end of each tip sampling resistor connected to opposite ends of the tip resistor, the other end of each tip sampling resistor forming a tip sense node;

a ring resistor series-coupled to the ring node and the power circuitry; and

a pair of ring sampling resistors one end of each ring sampling resistor connected to opposite ends of the ring resistor, the other end of each ring sampling resistor forming a ring sense node.

6. The subscriber loop linefeed driver of claim 4 wherein the sensed tip signal is a differential tip signal proportional to the tip current, wherein the sensed ring signal is a differential ring signal proportional to the ring current.

7. The subscriber loop linefeed driver of claim 4 wherein the power circuitry comprises:

a tip control circuit, wherein the tip control circuit increases a tip node voltage in response to a first tip control signal, wherein the tip control circuit decreases a tip node voltage in response to a second tip control signal; and

a ring control circuit wherein the ring control circuit increases a ring node voltage in response to a first ring control signal, wherein the ring control circuit decreases a ring node voltage in response to a second ring control signal.

8. The subscriber loop linefeed driver of claim 7 wherein the tip control circuit comprises:

a first transistor of a first type having an emitter coupled to receive the first tip control signal;

a second transistor of the first type having an emitter coupled to receive the second tip control signal, wherein a base of each of the first and second transistors is coupled to first node;

a third transistor of a second type having a collector coupled to a collector of the first transistor and an emitter coupled to a second node; and

a resistor having a first end coupled to the second node, a second end of the resistor coupled to a base of the third transistor and a collector of the second transistor.

9. The subscriber loop linefeed driver of claim 8 wherein the first type is a PNP bipolar junction transistor, wherein the second type is an NPN bipolar junction transistor.

10. The subscriber loop linefeed driver of claim 4 further comprising:

voiceband circuitry for bi-directional communication of voiceband data between the ring and tip nodes and a voiceband data interface, wherein the voiceband circuitry provides the analog voiceband data interface with d.c. isolation from the ring and tip nodes.

11. The apparatus of claim 10 wherein the voiceband circuitry further comprises:

a first voiceband data output node;

a load coupled to the first voiceband data output node; and

a first voiceband data input node, wherein the load and the first voiceband data input node are capacitively coupled to a selected one of the tip and ring nodes.

12. The apparatus of claim 4 further comprising voiceband circuitry for bi-directional communication of voiceband data between the ring and tip nodes and a voiceband data interface, wherein the voiceband circuitry further comprises:

a first voiceband data input node capacitively coupled to a selected one of the ring and tip nodes for receiving voiceband data from the subscriber loop, wherein voiceband data transmitted to the subscriber loop is superimposed on the linefeed control signals.

13. An apparatus comprising:

an integrated circuit generating subscriber loop control signals in response to a sensed tip signal and a sensed ring signal of the subscriber loop, the sensed tip and sensed ring signals received at first and second node sets, respectively, of the integrated circuit, wherein each of the first and second node sets includes at least one node distinct from the other set; and

a linefeed driver for driving a subscriber loop in accordance with the subscriber loop control signals, the linefeed driver providing the sensed tip and ring signals.

14. The apparatus of claim 13 wherein the integrated circuit is a complementary metal oxide semiconductor (CMOS) integrated circuit.

15. The apparatus of claim 13 wherein the linefeed driver comprises:

power circuitry for providing battery feed to a ring node and a tip node of a subscriber loop in accordance with a linefeed control signal; and

sense circuitry providing a sensed tip signal and a sensed ring signal, wherein the sensed tip and ring signals correspond to a tip current and a ring current of the subscriber loop.

16. The linefeed driver of claim 15 wherein the sense circuitry comprises:

a tip resistor series-coupled to the tip node and the power circuitry;

a pair of tip sampling resistors one end of each tip sampling resistor connected to opposite ends of the tip resistor, the other end of each tip sampling resistor forming a tip sense node;

a ring resistor series-coupled to the ring node and the power circuitry;

a pair of ring sampling resistors one end of each ring sampling resistor connected to opposite ends of the ring resistor, the other end of each ring sampling resistor forming a ring sense node.

17. The linefeed driver of claim 15 wherein the sensed tip signal is a differential tip signal proportional to the tip current, wherein the sensed ring is a differential ring signal proportional to the ring current.

18. The linefeed driver of claim 15 wherein the power circuitry comprises:

a tip control circuit, wherein the tip control circuit increases a tip node voltage in response to a first tip control signal, wherein the tip control circuit decreases a tip node voltage in response to a second tip control signal; and

a ring control circuit wherein the ring control circuit increases a ring node voltage in response to a first ring control signal, wherein the ring control circuit decreases a ring node voltage in response to a second ring control signal.

19. The linefeed driver of claim 18 wherein the tip control circuit comprises:

a first transistor of a first type having an emitter coupled to receive the first tip control signal;

a second transistor of the first type having an emitter coupled to receive the second tip control signal, wherein a base of each of the first and second transistors is coupled to first node;

a third transistor of a second type having a collector coupled to a collector of the first transistor and an emitter coupled to a second node; and

a resistor having a first end coupled to the second node, a second end of the resistor coupled to a base of the third transistor and a collector of the second transistor.

20. The linefeed driver of claim 19 wherein the first type is a PNP bipolar junction transistor, wherein the second type is an NPN bipolar junction transistor.